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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/658,079	09/09/2003	Juzer Jangbarwala	18858-0	1434
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KEAN, MILLER, HAWTHORNE, D'ARMOND, MCCOWAN & JARMAN, L.L.P. ONE AMERICAN PLACE, 22ND FLOOR P.O. BOX 3513 BATON ROUGE, LA 70821			EXAMINER ZHENG, LOIS L	
			ART UNIT 1742	PAPER NUMBER
DATE MAILED: 06/27/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/658,079

Applicant(s)

JANGBARWALA, JUZER

Examiner

Lois Zheng

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 05 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1, 3-26, 29, 30, 32 and 33 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 3-26, 29, 30, 32 and 33 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Status of Claims*

1. Claims 2, 27-28 and 31 are canceled in view of the amendment filed 5 April 2006. New claim 33 is entered in view of the amendment. Therefore, claims 1, 3-26, 29-30 and 32-33 are currently under examination.

Due to a discovery of Buck US 6,284,201 B1, new grounds of rejection are added, which renders this Office Action Non-Final.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1 and 3-26 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In this case, the amended feature of "wherein said electric current resistively heats said catalyst, thereby disproportionately increasing a temperature of said catalyst with respect to said support" as recited in instant claim 1 is not described in the original specification. Claims 3-26 are rejected since they depend on instant claim 1.

4. Claims 29-30 and 32-33 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject

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matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In this case, the amended feature of "wherein said electric current resistively heats said catalyst such that a temperature of said catalyst substantially increases with respect to said electrically conductive carbonaceous material" as recited in instant claim 29 is not described in the original specification.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1, 3-7, 17-18, 23, 29 and 32 are rejected under 35 U.S.C. 102(b) as being anticipated by Buck US 6,284,201 B1(Buck).

Buck teaches the use of a heat-resistant fibrous material supported catalyst in a catalytic reaction of internal combustion engines(abstract). Buck also teaches that the heat-resistant fibrous material is electrically conductive carbon fiber(col. 2 lines 19-23, col. 3 lines 9-19, col. 10 lines 26-29) or active carbon fiber (col. 11 lines 27-29, col. 6 lines 63-67) and the catalyst is Pt or Pd (col. 9 lines 33-34). Buck also teaches that the catalyst support can be coated by SiO<sub>2</sub>(col. 3 lines 20-24).

Regarding claims 1, 3-7, 17, 29 and 32, Buck inherently teaches the claimed "providing said catalyst on a support of electrically conductive carbonaceous material".

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Buck further teaches the claimed "supplying an electric current to said support such that the support passes said electric current to said catalyst"(col. 10 lines 52-64). Since Buck's carbon fiber support is electrically conductive and heat resistant, the examiner concludes that the claimed electric current resistive heating and the claimed disproportionate increasing in catalyst temperature with respect to the support are inherently taking place in the electrochemical reaction process of Buck. The SiO<sub>2</sub> coating as taught by Buck reads on the claimed catalyst carrier.

Regarding claim 18, Buck further teaches that the carbon fiber is folded or rolled (Figs. 9-10, col. 7 lines 44-59). Since the carbon fiber of Buck provides support to the catalyst, Buck inherently teaches the claimed reaction being carried out by passing chemical reactants between the carbon fiber folds or rolls.

Regarding claim 23, Buck further teaches that the catalyst temperature is increased to approximately 800°C (col. 10 lines 16-18) and carbon fiber support permits internal heating of the catalyst body to be performed (col. 10 lines 26-30). Therefore, the examiner concludes that the Buck inherently teaching electrically heating the catalyst to approximately 800°C, which reads on the catalyst temperature limitation.

### ***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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8. Claims 10-11, 13-15, 25-26 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buck.

The teachings of Buck are discussed in paragraph 6 above.

Regarding claims 10-11, Buck further teaches that the catalyst can be applied in gas phase via chemical vapor deposition (col. 9 lines 35-37). Therefore, one of ordinary skill in the art would have found the claimed catalyst particles obvious since the gas phase catalyst as taught by Buck is likely to be applied in particle form. In addition, Buck further teaches that the carbon fiber catalyst support is connected to two electrically conductive contact strips, one at each end (col. 10 lines 52-57, Fig. 23 numerals 39-40). Therefore, Buck inherently teaches that the catalyst particles are captured between a pair of electrodes as claimed.

Regarding claims 13-15 and 33 even though Buck does not explicitly teach the claimed heat conductivity, electrical resistivity and dielectric constant, one of ordinary skill in the art would have found it obvious that the electrically conductive carbon fiber catalyst support of Buck possess the same heat conductivity, electrical resistivity and dielectric constant as claimed since heat conductivity, electrical resistivity and dielectric constant are inherent properties of the electrically conductive carbon fiber.

Regarding claims 25-26, Buck's teaching further implies that the carbon fiber catalyst support is non-woven (col. 6 lines 15-17). Therefore, even though Buck does not explicitly teach the claimed non-woven carbon fiber plug, one of ordinary skill in the art would have found the claimed non-woven carbon fiber plug obvious since non-woven carbon fiber plug is a variation of non-woven carbon fiber as taught by Buck. It is well

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settled that the shape or configuration of the claimed object is a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed object was significant. In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966) . See MPEP 2144.04.

9. Claims 8-9, 16 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buck in view of Abe US 6,641,795 B2(Abe).

The teachings of Buck are discussed in paragraph 6 above. However, Buck does not explicitly teach the claimed carrier pore size or claimed carrier surface area.

Abe teaches catalyst, such as Pd, Pt, Co and Ni, are carried by suitable carriers such as  $\text{Al}_2\text{O}_3$ ,  $\text{SiO}_2$ ,  $\text{TiO}_2$ ,  $\text{ZrO}_2$ ,  $\text{MgO}$ , etc. (col. 12 lines 28-67). Abe further teaches that the catalyst carrier has a surface area in the range of  $5\text{-}300\text{m}^2/\text{g}$  (col. 12 lines 47-61).

Regarding claims 8-9, it would have been obvious to one of ordinary skill in the art to have incorporated the catalyst carriers of Abe having a surface area of  $5\text{-}300\text{m}^2/\text{g}$  into the catalyst carrier of Buck in order to enhance the activity and durability as taught by Abe (col. 12 lines 42-46 and 56-59). Therefore, the surface area of Buck in view of Abe reads on the claimed surface area of  $1\text{-}1000\text{m}^2/\text{g}$ . Even though Buck in view of Abe do not explicitly teach the claimed carrier pore diameter, one of ordinary skill in the art would have found the claimed carrier pore diameter obvious since Buck in view of Abe teaches the same catalyst carrier with the same surface area as claimed. In addition, Even though Buck in view of Abe do not explicitly teach that the carrier is

sintered, one of ordinary skill would have found the claimed sintered carrier obvious since sintering is a cost effective and common method to make a porous material.

Regarding claim 16, since Buck teach an electrically conductive carbon fiber supported catalyst that is significantly similar to that of the instant invention(i.e. same catalyst support material, same catalyst, similar carrier surface area and pore size), one of ordinary skill in the art would have found it obvious that the catalyst amount of Buck would have inherently overlap the claimed catalyst amount, which establishes a prima facie case of obviousness.

Regarding claim 22, since Abe teaches that catalyst such as Pt and Co are functionally equivalent, one of ordinary skill in the art would have found it obvious to incorporate Co as taught by Abe into the Pt catalyst of Buck with expected success.

10. Claims 12 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buck in view of Suenaga et al. US 2002/0177032 A1(Suenaga).

The teachings of Buck are discussed in paragraph 6 above. However, Buck does not explicitly each the claimed catalyst support pore size.

Suenaga teaches supporting catalysts, such as Pt, on conductive carbon fibers having a pore diameter of about 1nm to about 10 $\mu$ m (paragraphs [0054]-[0055]).

Regarding claim 12, it would have been obvious to one of ordinary skill in the art to have incorporated the conductive carbon fibers having a pore diameter of about 1nm to about 10 $\mu$ m as taught by Suenaga into the carbon fibers of Buck in order to achieve good catalyst volume without experiencing reduced service efficiency as taught by Suenaga.



Regarding claim 24, Suenaga further teaches that the conductive carbon fiber supported catalyst can be used in a methanol steam reforming reaction(paragraph [0039]. Therefore, one of ordinary skill in the art would have found it obvious that the electrically conductive carbon fibers supported catalyst as taught by Buck can also be used in a methanol steam reforming reaction as claimed.

11. Claims 19-20 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buck in view of Colbert US 6,824,755 B2(Colbert).

The teachings of Buck are discussed in paragraph 6 above. However, Buck does not teach that the catalyst support is a polymeric adsorbent such as an ion exchange resin as claimed.

Colbert teaches using ion exchange resin covered carbon nanotube as catalyst support(col. 13 lines 29-33)

Therefore, it would have been obvious for one of ordinary skill in the art to have incorporated the ion exchange resin covered carbon nanotube of Colbert into the process of Burk as the catalyst support since Colbert's ion exchange resin covered carbon nanotube is functionally equivalent to the catalyst support of Buck. The remaining claim limitations in claim 30 are rejected for the same reasons as stated in the rejection of claim 1 above.

12. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Buck in view of Colbert, and further in view of Abe.

The teachings of Buck in view of Colbert are discussed in paragraph 11 above.

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The teachings of Abe are discussed in paragraph 9 above. Abe further teaches that the catalyst is used in the form of beads(col. 7 lines 57-60).

Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated beads of Abe into the ion exchanger resin covered carbon nanotube of Buck in view of Colbert since Abe teaches that beads have good fluid miscibility and thermal conductivity.

13. Claims 1, 3-11, 17, 22-26, 29-30 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abe US 6,641,795 B2(Abe) in view of Puskas et al. US 4,415,479(Puskas).

The teachings of Abe and Puskas are discussed in paragraph 9 of the previous Non-Final Office Action mailed 20 January 2006. The rejection ground for the instant claims 1, 3-11, 17, 22-26, 29-30 and 32 are maintained for the same reasons as stated in paragraph 9 of the previous Non-Final Office Action.

14. Claims 4, 12-18 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abe in view of Puskas, and further in view of Parmentier et al. US 6,383,972 B1 (Parmentier).

The teachings of Abe in view of Puskas and Parmentier are discussed in paragraph 10 of the previous Non-Final Office Action. The rejection ground of instant claims 4 and 12-18 is maintained the same reasons as stated in paragraph 10 of the previous Non-Final Office Action.

Regarding new claim 33, since Abe in view of Puskas and Parmentier teach using a carbon fiber that is substantially similar to the carbon fiber of the instant

invention as support for catalyst such as Pt, Pd, Ni, etc., one of ordinary skill in the art would have expected the carbon fiber of Abe in view of Puskas and Parmentier to have substantially the same inherent properties, such as the claimed electrical resistivity and the claimed dielectric constant, as the carbon fiber of the instant invention. Therefore, a prima facie case of obviousness exists. The selection of claimed electrical resistivity and the claimed dielectric constant from the disclosed ranges of Abe in view of Puskas and Parmentier would have been obvious to one of ordinary skill in the art since Abe in view of Puskas and Parmentier teach the same utilities in their electrical resistivity and dielectric constant ranges.

15. Claims 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abe in view of Puskas, and further in view of Colbert US 6,824,755 B2(Colbert).

The teachings of Abe in view of Puskas and Colbert are discussed in paragraph 11 of the previous Non-Final Office Action. The rejection ground of instant claims 19-21 is maintained for the same reasons as stated in paragraph 11 of the previous Non-Final Office Action.

16. Claim 1, 5, 23, 29-30 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Affleck et al US 4,868,841(Affleck) in view of Puskas.

The teachings of Affleck in view of Puskas are discussed in paragraph 12 of the previous Non-Final Office Action. The rejection ground of the instant claims 1, 5, 23, 29-30 and 32 are maintained for the same reasons as stated in paragraph 12 of the previous Non-Final Office Action.

### ***Response to Arguments***

17. Applicant's arguments filed on 5 April 2006 have been considered, but are not persuasive.

18. The declaration under 37 CFR 1.132 filed 10 November is insufficient to overcome the rejection of claims 1, 3-26, 29-30 and 32 based upon 35 U.S.C. 112, first paragraph, new matter rejection as set forth in the last Office action because: The Declaration lacks factual evidence(i.e. experimental data or examples) showing the "substantial or disproportion" temperature difference between the catalyst and the support . The Declaration also lacks factual(i.e. experimental data or examples) evidence showing that the temperature of the support remains substantially the same before and after the catalyst activation. For example, in paragraph 13, the statement of heating being generated at the site of any catalyst(claims 1, 29-30) does not exclude the heating of the support. Therefore, it does not clearly suggest that the catalyst is being disproportionately heated relative to the support as asserted. In addition, the instant specification recites that "By 'locally' is meant that heat is generated at the site of the catalyst where the heat is most useful in promoting the reaction," which does not necessarily translate into no heat generated at the site of the support". In paragraph 14, there is no factual evidence(i.e. experimental data or examples) for the assertion that the temperature of the catalyst substantially increases with respect to the support when an electric current is applied to the conductive carbonaceous support having any catalyst dispersed therein. In paragraph 15, no temperature data for Cu/Zr/Al catalyst and carbon cloth are provided in Example 2. Furthermore, the example 2 is not

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commensurate in scope with the instant claims 1 and 29-30. Therefore, the examiner does not consider applicant's arguments persuasive.

19. Regarding applicant's argument that Puskas does not teach that the active carbon support is electrically conductive, the examiner maintains the position that the active carbon support as taught by Puskas is electrically conductive as evidenced by Starz et al. US 2002/0034674 A1 (page 3, paragraph [0029]).

20. Regarding applicant's argument that Abe in view of Puskas do not teach a disproportionate temperature increase between the catalyst and the support, the examiner respectfully disagrees. Abe in view of Puskas teach a substantially the same process as instantly claimed process (i.e. electrically heating the same catalyst supported by substantially the same electrically conductive carbonaceous material), one of ordinary skill in the art would have found that the claimed disproportionate temperature increase in the catalyst with respect to the support to take place in the process of Abe in view of Puskas with expected success since substantially the same starting material and same operating conditions would generate substantially the same processing result.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lois Zheng whose telephone number is (571) 272-1248. The examiner can normally be reached on 8:30am - 5:00pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LLZ

  
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